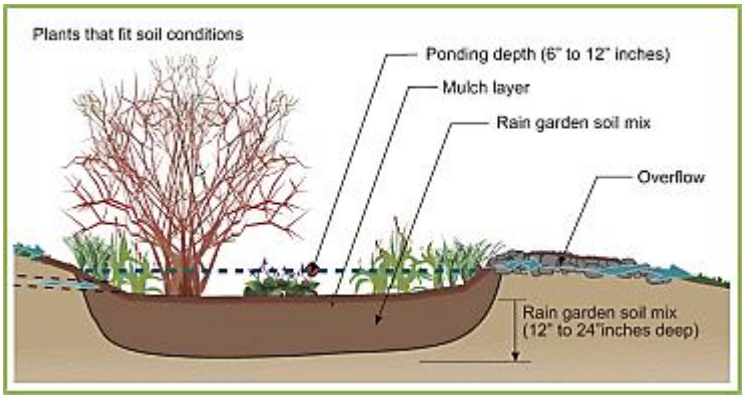
RAIN GARDEN GUIDE

What is a rain garden?

A rain garden has a bowl shape to collect the rain that runs off from a roof, driveway, parking area or yard. This 6 - 9 inch deep basin fills with runoff and allows it to seep into the ground in a few hours. The rain garden plants and soils filter the stormwater and cleanse pollutants that could harm water quality.



Letting the runoff soak in, rather than go into the street, replaces the groundwater that keeps streams flowing during dry times. On hot summer days, rain gardens also cool runoff from dark pavement by putting it into the ground. A constant supply of cool, clean groundwater is essential to the health of stream and pond life.

Rain gardens are planted with flowers, shrubs, trees and grasses that are easy-to-maintain and thrive without fertilizers and pesticides. There is an array of colorful plants that can be obtained at garden centers and home improvement stores, which will provide food and habitat for wildlife.

Why build a rain garden?

Every time it rains, the runoff from hard surfaces will pick up and carry dirt, bacteria, fertilizers, pesticides and debris, as well as oil and other fluids that drip from cars. By building a rain garden, you will help sustain the health of nearby brooks and ponds. Rain gardens attract birds and beneficial insects like butterflies and bees that pollinate plants, as well as dragonflies that eat mosquitoes. You and your family can learn from and enjoy watching these wildlife habitats that will enrich your yard.

Benefits of Rain Gardens

Storm runoff is the leading source of water pollution that can harm aquatic life and spoil recreational uses of lakes and brooks. Creating rain gardens has many water quality benefits:

- Gardens remove dirt, oil and metals in stormwater
- Plants recycle phosphorus and other nutrients
- Microbes in soils reduce bacteria levels in runoff

Rain gardens can help fix soil erosion problems by collecting excess water from rooftops or driveways. These special features can complement any home style, since there are many choices of shapes and plants for a rain garden. Communities across the country are restoring injured streams and reducing water treatment costs by installing rain gardens.

Where to build your rain garden

First, walk your yard in the rain and see where runoff from your roof, driveway and patio flows. Choose a spot where runoff naturally goes – the rain garden should be placed between the source of runoff and where it flows out of your yard. If the runoff stays in your yard and already soaks into the ground, you may not need to build a rain garden. It is also a good idea to talk to your neighbor if the garden will be close to the property line.

When choosing the location, your rain garden should be:

- at least 10 feet from the house foundation to avoid water seeping into your basement
- at least 25 feet from a septic tank leach field, or a private well
- located away from underground utilities (call DigSafe at 811 to check for locations of gas pipes and electric lines - at least three days before digging your garden)
- away from wet/soggy places where ponding persists after a storm
- away from tree roots that can be injured when digging the garden

You may decide to send additional water to the selected location depending on the amount of roof or pavement runoff. Flexible plastic pipe or a shallow gravel-filled trench can be used to convey runoff water from downspouts and paved areas into the rain garden.

Soils and Drainage

The soils in your yard affect how quickly the rain garden seeps into the ground. Soils will also help you determine which plants are best suited for your rain garden. Light, sandy soils drain fast but can be too dry between rains for some plants; heavy soils with silt and clay drain slower, but hold the moisture needed by garden plants. The runoff in the garden should soak into the ground within six hours; if there is standing water for more than six hours, consider making the garden larger.

How to size your rain garden

The rain garden can be almost any size, but time and cost are important in deciding how big to make your rain garden. Home rain gardens usually range between 100 to 300 square feet. But any size rain garden, even a small one, will help cleanse stormwater runoff.

For sandy soil, the rain garden should be 20-30% of the area that supplies the runoff. If 1,000 square feet of roof and driveway will supply runoff, your rain garden should be 200-300 square feet). For slower draining soils, a larger rain garden will be needed.

Runoff flowing into the garden should spread evenly across its entire length. Level areas are good spots for building a rain garden. Areas with slopes are more challenging. For details, see *The Vermont Rain Garden Manual* (http://www.vermontconservation.org/images/stories/vtraingardenmanual.pdf) or the *Wisconsin Rain Gardens* manual (http://learningstore.uwex.edu/assets/pdfs/GWQ037.pdf).

Designing and selecting plants for your rain garden

There are almost endless designs for rain gardens. The rain garden is yours to enjoy – there is no single best way to plant a rain garden – be creative and have fun designing! For visual charm, select plants that have varied heights, flowers, leaf color and shape, and that bloom or fruit at different times during the spring, summer and fall seasons.

Native species are recommended and when established do not need extra water or fertilizer. Native plants can provide habitat and food for the birds, insects and wildlife of the region. However, there are many types of ornamentals to also consider.

As you choose plants, keep in mind that the rain garden has moisture zones. The deepest part of the garden is most suited for plants that thrive in wet conditions. The side slopes are suitable for those that do well in drier conditions, and the rim of the garden is suitable for plants that grow in the driest and sometimes droughty conditions.

There is a wide variety of plants available for every condition such as: full sun or shade, or those that withstand 'wet feet' or are drought tolerant. After adding plants, top-off with three inches of mulch. Hardwood chips that aged for six months are good, and there are many other types of mulch.

How to dig your rain garden

Following are basic guidelines - for more information, visit EPA New England's "Soak up the Rain" website at http://www.epa.gov/region1/soakuptherain/index.html

When you know the location and size, you can start building the rain garden. Smaller gardens can be hand dug with a shovel, or equipment can be rented for larger gardens. ***At least 3 days before digging, call DigSafe at 811 to locate any underground utilities.***

Dig the rain garden about a foot deep to provide a 6 – 9 inch deep basin in the middle and allow room for three inches of mulch cover. If your garden will be on a level spot with well drained sandy or loamy soils, a level bottomed basin with gently sloping sides can be dug.

Heavy clay soils and slowly draining soils may need to be dug 2 - 3 feet deep and partly filled with coarse gravel, followed by a soil mix of 50% sand, 30% compost and 20% loam. This will both improve drainage and help plants to grow well. (If groundwater seeps into the bottom of the excavation, find another place to build your rain garden.)

If the rain garden is on a slope, a low berm on the downhill side is required. Create the berm by placing dug soil on the downhill side to make it level with the uphill side (so the garden rim is the same height all around).

After shaping the berm, add grass seed and cover with mulch to prevent erosion of the berm until the grass takes root. Use a carpenter's level on a board to form a level bottom where runoff will pool and seep into the ground.

Sunny rain garden plants

The places in your yard that get full sun for six or more hours a day, or partial sun (four to six hours per day) will be good spots for flowering plants. There are hundreds of perennials and shrubs that can be planted in sunny rain gardens. It is a good idea to ask your garden center or home improvement store about sun and soil conditions that are suitable for the plants you intend to put in your garden.

A few examples of popular native species that do well in sunny rain gardens are listed below.

<u>*Perennial flowers:*</u>

Butterfly Milkweed (*Asclepias tuberosa)* - orange flowers attract Monarch butterflies
Bee Balm *(Monarda didyma)* – pink or red flowers attract hummingbirds
New England Aster *(Aster novae-angliae)* **–** bright purple flowers in early fall
Turtlehead *(Chelone glabra)* – interesting lavender flower spikes in early fall
Black-Eyed Susan (*Rudbeckia hirta)* – golden flowers bloom in summer and fall
Coneflower (*Echinacea purpurea)* – striking pink or white flowers attract butterflies
Boneset *(Eupatorium perfoliatum)* – sweet smelling white blooms attract butterflies
Blue Wild Indigo *(Baptisia australis)* – blue flowers and interesting seed pods

Turtlehead

<u>*Grasses:*</u>

Switch Grass (*Panicum virgatum)* - quick growing, spring wild life cover
Little Bluestem (*Schizachyrium scoparium)* - turns reddish orange in fall

<u>*Shrubs:*</u>

Sweet Pepperbush (*Clethra alnifolia)* - fragrant flowers attract butterflies
Red Twig Dogwood *(Cornus Sericea)* – red stems make a winter highlight
Bridalwreath Spiraea *(Spirea latifolia)* – cluster of small white flowers

Sweet Pepperbush

Shady Rain Gardens:

Places in your yard that have less than four hours of sun a day are spots for shade tolerant plants. There are many perennials and shrubs that do well in shady conditions. Ask your garden center or home improvement store about the shade and soil conditions for plants you intend to put in your garden. A few examples of native species that do well in shady rain gardens are noted below.

<u>*Perennials:*</u>

Cardinal Flower (*Lobelia cardinalis)* - *v*ibrant red spiky flowers, short-lived
Blue Flag Iris *(Iris versicolor)* – eye-catching blue-violet flowers
Goatsbeard *(Aruncus dioicus)* **–** grows to five feet tall with white flowers
Wild Bleeding Heart *(Dicentra eximia)* – pink flowers early spring
Columbine *(Aquilegia canadensis)* – red orange flowers attract butterflies
Sensitive Fern *(Onoclea sensibilis)*

Bleeding Heart

<u>*Shrubs:*</u>

Spicebush *(Lindera benzoin)* - white flowers
Swamp Rose (*Rosa palustris*) – large white, pink or red flowers
Highbush Blueberry *(Vaccinium corymbosum)* – small white flowers

Swamp Rose

Cost for Building Garden

This will vary depending on what you want and are able to do. If you do the design, digging, and collect seeds or plants from other people with gardens, the cost will be minimal. Or you can hire a contractor to design and build your garden. Costs for a homeowner installed rain garden will be about $2 – $5 per square foot, depending on the types of plants and accessories that you want. Many landscapers are expert in designing and building rain gardens, and the cost can range from $8 – $12 per square foot, again depending on what you want.

Rain Garden Maintenance

A rain garden may need less attention than a lawn, but some maintenance is required. These measures include:

Weed during the first few months, as maturing plants grow to fill up the garden. The rain garden mulch will reduce weed seed germination and the loss of soil by erosion.

Pruning plants. Stems and seed heads may be kept for winter interest, wildlife cover, and bird food. Tattered and discolored plants should be cut back after the spring growth is 4–6 inches tall. Deadhead flowers to promote new growth.

Mulch will need to be added every two or three years to maintain a 3 inch depth of mulch.

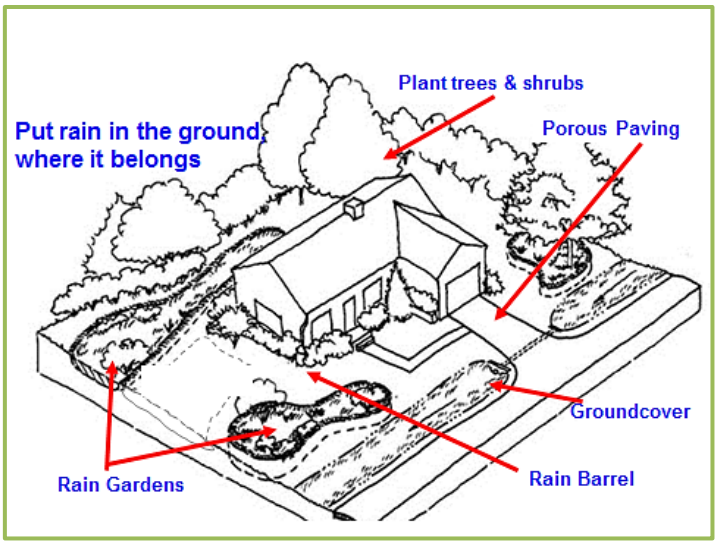
Replant as needed to replace plants that do not survive, or to add more plants to the garden. If a plant is not thriving where you first placed it, move the plant to another spot. Some areas in the garden will be wetter or drier and moving a plant can enable better conditions for growth.

Sediment that collects in the rain garden shows successful removal from runoff. Once or twice a year, use a flat shovel to remove any excess.

More Runoff Remedies…

Rain gardens are an especially attractive way to keep nearby streams and ponds healthy. In addition, there are many other inexpensive ways to put rain back in the ground and cleanse storm runoff.

Installing some of the following can help cleanse 50,000 or more gallons of stormwater annually, and benefits accrue year after year. These improvements can be done over several years to spread out the time and costs for reducing the runoff from your yard.



Vegetated Swale

Like a rain garden, a shallow swale (gently sloping channel) can cleanse runoff from your roof, driveway or parking area. The swale is planted with grass, perennials and shrubs that can handle an occasional dunking and the moist soil conditions. As runoff flows in the swale, the vegetation filters it, and allows it to soak into the ground. Where soils do not drain well, swales can carry the runoff to a rain garden or soakage trench (see below). Swales may include small check dams to help slow and detain the flow. A swale can be an attractive landscaped area for a home, church, school or business. The maintenance requirements are similar to rain gardens.

Infiltration (soakage) Trench

Rock-filled trenches offer another way to help runoff seep into the ground:

- ☐ Shallow *conveyance trenches* up to 12 inches deep convey runoff to a rain garden or other area with well-drained soil. These trenches can collect runoff from your roof or driveway and carry it away from buildings. Slopes greater than 4% require check dams, and slopes should be less than 15%.
- ☐ Deeper *infiltration trenches* **(**18 inches or more) hold a lot of water from storms in the spaces between the rocks and allow it to soak into the ground. Infiltration trenches should be 5 feet away from your property lines, and 10 feet away from any building. Grass or flowers can be planted over the soakage trench, or you can create a walkway above the trench.

Don't locate trenches in soggy areas (where water won't soak in), or over underground utilities, or major tree roots. At least 3 days before digging, call DigSafe at 811 to locate any utilities.

Groundcover Buffer

A 5 - 10 foot wide evergreen ribbon at the edge of your street or beside your driveway is another option to filter runoff and allow it to seep into the ground. Groundcovers like Pachysandra or Myrtle (also called Periwinkle) are an inexpensive way to slow runoff and allow it to soak into the ground.

Groundcover buffers require little maintenance and build spongy soil under the plants. Myrtle grows well in moist shady spots and blooms in spring creating a carpet of purple flowers. Like Myrtle, Pachysandra is easy to propagate with rooted stem cuttings and it prefers a moist, well-drained, acidic, rich soil in full shade, but is tolerant of dry soils. Ask your garden center or home improvement store for details about sun and soil conditions.

More Information about rain gardens

The following are links to free downloadable guides that supply additional information. Notes about each guide are also provided for your reference.

University of Connecticut Extension , 2006. *Rain Gardens, A Design Guide for Homeowners.* http://nemo.uconn.edu/tools/publications.htm The 12 pp. guide has colorful illustrations about rain garden design, size, installation and a short list of suggested plants.

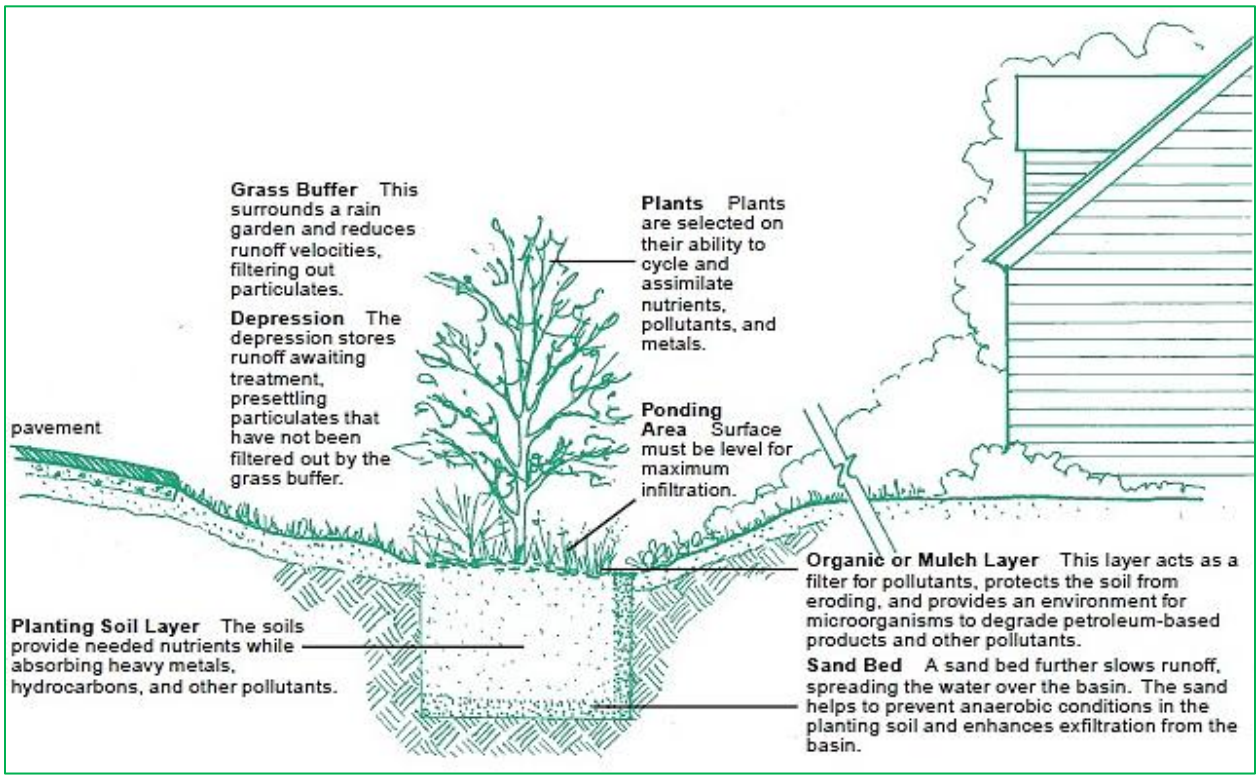
University of Wisconsin Extension, 2003. *Rain Gardens, A how-to manual for homeowners.* http://learningstore.uwex.edu/assets/pdfs/GWQ037.pdf The 32 pp. manual has FAQs, details on site selection, size, design, digging, planting, maintenance, costs and 10 sample planting plans.

Winooski Conservation District, 2008. *The Vermont Rain Garden Manual*. http://www.vacd.org/winooski/winooski_raingarden.shtml The 20 pp. manual has details on design, installation, and 6 planting plans. A separate download has descriptions for 150 rain garden plants.

Other websites with descriptions of rain garden plants:
YouTube. http://www.youtube.com/ has many helpful videos about rain gardens. Visit the YouTube website and enter rain gardens in search box.

Project Native. http://www.projectnative.org/ has descriptions with photos of native perennials, ferns, trees, shrubs and vines. Plants can be purchased at Plant Native's farm store in Housatonic MA, and seeds can be shipped.

Illustration below is from the Virginia Department of Forestry, 2008. *Rain Gardens Technical Guide.* http://www.dof.virginia.gov/mgt/print/Rain-Gardens-Tech-Guide.pdf The 36 pp. guide has photos, illustrations and descriptions of garden planning, building, costs, maintenance, as well as sample planting plans and a table of 116 plants for rain gardens.



Wellesley Natural Resources Commission

"It is the mission of the Natural Resources Commission to provide stewardship, education and advocacy of the Town of Wellesley's park, conservation, outdoor recreation and open space resources so that the full value of the Town's natural assets can be passed on to future generations.

The NRC's Green Wellesley Campaign advocates for sustainability by raising awareness and promoting increased environmental action. In particular, the campaign focuses on the management and stewardship of our Town's green spaces, including its trees, wetlands and watersheds, trails, and its community garden. Additionally, the NRC advocates for energy conservation and renewable energy expansion, better stormwater management, pesticide reduction/elimination, and improved recycling and composting programs. Please join the NRC's Green Wellesley Campaign by emailing the NRC Director Janet Hartke Bowser at jbowser@wellesleyma.gov, or call 781-431-1019, ext. 2290."

Massachusetts Watershed Coalition

The Coalition's mission is to protect and restore streams, lakes and water supplies. The MWC partners with communities to enable low impact design & sustainable watersheds. We also help home owners, businesses and community groups to design and install practices that prevent and fix stormwater problems. For more information, visit www.commonwaters.org or telephone 978-534-0379.